



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/815,901	03/22/2001	David Palagashvili	AM 3137	9710

7590 06/04/2004

Patent Counsel  
APPLIED MATERIALS, INC.  
P.O. BOX 450 A  
SANTA CLARA, CA 95052

EXAMINER
----------

ALEJANDRO MULERO, LUZ L

ART UNIT	PAPER NUMBER
----------	--------------

1763

DATE MAILED: 06/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/815,901

Applicant(s)

PALAGASHVILI ET AL.

Examiner

Luz L. Alejandro

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1203.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 6, 8, and 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Dolbear et al., U.S. Patent 4,993,482.

Dolbear et al. shows the invention as claimed including a thermal transfer device comprising a thermal source 10 maintained in parallel to a thermal sink 20 and having a thermally conductive, compressible, multiple turn coil 22 between the thermal source and the thermal sink; the thermal sink surrounds the thermal source; the coil is made of copper; wherein the thermal source and the thermal sink are concentric; wherein the thermal sink includes a means of cooling; and wherein the coil fills a space between the thermal source and the thermal sink (see, for example, figs. 1-3B, and their descriptions).

Claims 1-2, 6-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Chu et al., U.S. Patent 4,156,458.

Chu et al. shows the invention as claimed including a thermal transfer device comprising a thermal source 10 maintained in parallel to a thermal sink 16 and having a thermally conductive, compressible, multiple turn coil 20 between the thermal source

Art Unit: 1763

and the thermal sink; the thermal sink surrounds the thermal source; the coil is made of copper wire about 0.011 inch thick; wherein the thermal source and the thermal sink are concentric; wherein a surface of the thermal sink facing the thermal source is grooved to accommodate the compressible coil; wherein the thermal sink includes a means of cooling; and wherein the coil fills a space between the thermal source and the thermal sink (see, for example, figs. 1-7, and col. 1-line 57 to col. 6-line 19).

Claims 1-3, 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Murugesh, U.S. Patent 5,994,662.

Murugesh shows the invention as claimed including a thermal transfer device comprising a thermal source 32 maintained in parallel to a thermal sink 64 and having a thermally conductive, compressible, multiple turn coil 72 between the thermal source and the thermal sink; the thermal sink surrounds the thermal source; the thermal source is made of a dielectric material; wherein the thermal source and the thermal sink are concentric; wherein a surface of the thermal sink facing the thermal source is grooved to accommodate the compressible coil; wherein the thermal sink includes a means of cooling; and wherein the coil fills a space between the thermal source and the thermal sink (see, for example, figs. 1, 3-4, and their descriptions).

Claims 1-3, 6, 8, 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Collins et al., EP 0837489.

Art Unit: 1763

Collins et al. shows the invention as claimed including a thermal transfer device comprising a thermal source 52 maintained in parallel to a thermal sink 74 and having a thermally conductive, compressible, multiple turn coil 42 between the thermal source and the thermal sink; the thermal sink surrounds the thermal source; the thermal source is made of a dielectric material; wherein the coil is made of a copper wire; wherein the thermal source and the thermal sink are concentric; wherein the thermal sink includes a means of cooling; and wherein the coil fills a space between the thermal source and the thermal sink (see, for example, figs. 5 and 18, and their descriptions).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 1763

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dolbear et al., U.S. Patent 4,993,482.

Dolbear et al. is applied as above but does not expressly disclose that the coil is made from a copper wire of about 0.011 inch thick, however the reference discloses that the characteristics of the coil wire including the dimensions of the copper wire will depend on the thermal and mechanical specifications needed for the application at hand (see, for example, col. 3, lines 35-40). Therefore, a prima facie case of obviousness still exists because it would have been obvious to one of ordinary skill in the art to optimize the thickness of the copper wire during routine experimentation depending upon, for example, the desired thermal and mechanical specifications, and would not lend patentability to the instant application absent the showing of unexpected results.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murugesh, U.S. Patent 5,994,662 in view of Moslehi et al., U.S. Patent 4,996,077.

Murugesh is applied as above but does not expressly disclose that the dielectric material of the thermal source is sapphire, however, the reference in col. 18, lines 57-59, discloses the use of sapphire as an energy transmission material. Furthermore, Moslehi et al. discloses the use of sapphire as a dielectric material for transmission windows. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Murugesh as to comprise a window made of sapphire because such dielectric material is known in the art to be suitable for transmission of energy.

Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murugesh, U.S. Patent 5,994,662 in view of Boulos, U.S. Patent 4,853,250.

Murugesh is applied as above but does not expressly disclose that the coil is made of a copper wire about 0.011 inch thick. Boulos et al. discloses a coil made of copper wire (see, for example, col. 3, lines 42-44). Furthermore, through the knowledge generally available to one of ordinary skill in the art, one of ordinary skill in the art would know/understand that coils are typically made of a copper wire. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Murugesh as to comprise the coil made of copper wire since such material is known to be suitable for coils.

With respect to the copper wire being about 0.011 inch thick, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device, see *In Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Collins et al., EP 0837489 in view of Moslehi et al., U.S. Patent 4,996,077.

Collins et al. is applied as above but does not expressly disclose that the dielectric material of the thermal source is sapphire. Moslehi et al. discloses the use of sapphire as a dielectric material for transmission windows. Therefore, it would have

been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Collins et al. as to comprise a window made of sapphire because such dielectric material is known in the art to be suitable for transmission of energy.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Collins et al., EP 0837489.

Collins et al. is applied as above but does not expressly disclose that the thermal sink is made of a dielectric material, however, the reference discloses that the thermal sink can be made of various material including non-metallic materials (see, for example, page 13, lines 33-35). Therefore, it would have been an obvious choice of design to one having ordinary skill in the art at the time the invention was made to make the thermal sink of the apparatus of Collins et al. of a dielectric material because such type of material is a known non-metallic material. Furthermore, such limitation would not lend patentability to the instant application absent the showing of unexpected results.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Collins et al., EP 0837489 in view of Boulos, U.S. Patent 4,853,250.

Collins et al. is applied as above but does not expressly disclose that the coil is made of a copper wire about 0.011 inch thick, however, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform



Art Unit: 1763

differently than the prior art device, the claimed device was not patentably distinct from the prior art device, see *In Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984).

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herchen, U.S. Patent 5,747,917 in view of Dolbear et al., U.S. Patent 4,993,482 or Chu et al., U.S. Patent 4,156,458.

Herchen shows the invention substantially as claimed including a vacuum chamber comprising: a processing chamber 62 including a substrate to be processed; a processing gas inlet source 82 that traverses a microwave energy source 63 for forming plasma from the processing gas; a microwave impervious gas inlet 42 made of a dielectric material in the form of a tube that provides a thermal source, the dielectric tube surrounded by a concentric dielectric tube 44 that provides a thermal sink (see col. 4-line 53 to col. 47 and figs. 3 and 4).

Herchen does not expressly disclose a compressible, thermally conductive, multiple turn coil between the thermal sink and the thermal source. Dolbear et al. discloses the use of thermally conductive, compressible, multiple turn coil between a thermal source and a thermal sink in order to provide multiple contact points between the thermal source and the thermal sink for maximizing the heat transfer (see, for example, col. 1, lines 67-68 and col. 3, lines 21-40). Additionally, Chu et al. discloses the use of thermally conductive, compressible, multiple turn coil between a thermal source and a thermal sink in order to contact sufficient surface area of the heat source

Art Unit: 1763

to provide the required heat transfer and because such coil is flexible enough to absorb differences in distance between the heat source and the heat sink as well as to expand and contract due to temperature changes (see, for example, col. 1-line 57 to col. 2-line 5). Therefore, in view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Herchen as to further comprise a compressible, thermally conductive, multiple turn coil between the thermal sink and the thermal source in order to contact sufficient surface area of the heat source to provide the required heat transfer and because such coil is flexible enough to absorb differences in distance between the heat source and the heat sink as well as to expand and contract due to temperature changes. Furthermore, the claimed coil configuration would have been a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed coil is significant, see *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Regarding claim 7, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device, see *In Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984).

With respect to claims 2-5, 8, and 10, note that the thermal sink 44 surrounds the thermal source 42 and that both are concentric (see figs. 3 and 4); the thermal source

and the thermal sink are made of sapphire (see col. 5, lines 34-42); and the thermal sink includes means for cooling (see col. 5, lines 14-17).

Regarding claim 9, note that Chu et al. discloses that the outer wall of the thermal sink is grooved to accommodate the compressive coil. Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Herchen by accommodating the coil in a groove in the thermal sink because such configuration is suitable for a good thermal contact and heat transfer.

With respect to claim 11, note that the coil of the apparatus of Herchen modified by Dolbear et al. and Chu et al. will fill a gap between the thermal source and the thermal sink.

Claims 1-2 and 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hao et al., U.S. Patent 6,123,775 in view of Dolbear et al., U.S. Patent 4,993,482 or Chu et al., U.S. Patent 4,156,458.

Hao et al. shows the invention substantially as claimed including a thermal transfer device comprising a thermal source 20 maintained in parallel to a thermal sink 22 and having thermally conductive coils 36 between them (see col. 5, lines 8-52 and figs. 4 and 4a).

Hao et al. does not expressly disclose that the coils are made of a material that is compressible and in the form of a single multiple turn coil, however, the reference, in col. 5, lines 45-48, clearly discloses that heat transfer members 36 can be in other

suitable shapes. Dolbear et al. discloses the use of thermally conductive, compressible, multiple turn coil between a thermal source and a thermal sink in order to provide multiple contact points between the thermal source and the thermal sink for maximizing the heat transfer (see, for example, col. 1, lines 67-68 and col. 3, lines 21-40).

Additionally, Chu et al. discloses the use of thermally conductive, compressible, multiple turn coil between a thermal source and a thermal sink in order to contact sufficient surface area of the heat source to provide the required heat transfer and because such coil is flexible enough to absorb differences in distance between the heat source and the heat sink as well as to expand and contract due to temperature changes (see, for example, col. 1-line 57 to col. 2-line 5). Therefore, in view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Hao et al. as to further comprise a compressible, thermally conductive, multiple turn coil as the heat transfer member between the thermal sink and the thermal source in order to contact sufficient surface area of the heat source to provide the required heat transfer and because such coil is flexible enough to absorb differences in distance between the heat source and the heat sink as well as to expand and contract due to temperature changes. Furthermore, the claimed coil configuration would have been a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed coil is significant, see *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

With respect to claims 2, 6, and 8-11, note that the thermal sink surrounds the thermal source and that both are concentric (see fig. 4); the thermally conductive coil can be made of Cu (see col. 4-line 42); the outer wall of the thermal sink is grooved to accommodate the compressive coil, and the coil fills a gap between the thermal source and the thermal sink (see fig. 4); the thermal sink includes means for cooling (see col. 3, lines 48-50).

Regarding claim 7, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device, see *In Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984).

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

Art Unit: 1763

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 571-272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Luz L. Alejandro  
Primary Examiner  
Art Unit 1763

June 1, 2004